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AUTHOR Meacham, John A.; Nicolai, Philip
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ABSTRACT

Preschool children were presented with conflicting cues in order to assess the importance of pointing, verbalizing, and looking by adults in directing the attention of children. The study involved two procedures: first, the experimenter indicated by pointing, verbalizing, or looking whether a big or little bead was to be put on a string by the child; following this, the child indicated for the experimenter which beads he should put on the string. Seven girls and 16 boys, ranging in age 3 to 6 years, were included in the study. Results indicated that children were most likely to attend to pointing cues of adults and least likely to attend to the adult's eyes as a cue. These results are contrary to suggestions that speech is of primary importance in the development of attention, and further suggest (1) the necessity of considering attention as a factor in investigations of various modes of representation; and (2) that the importance of nonverbal means of instruction for preschoolers should not be neglected. (Author/ED)

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POINTING, VERBALIZING, AND LOOKING AS CUES FOR PRESCHOOLERS

John A. Meacham and Philip Nicolai

State University of New York at Buffalo

Four- and five-year-old children were presented with conflicting cues in order to assess the importance of pointing, verbalising, and looking by adults in directing the attention of children. Children were most likely to attend to pointing, least likely to attend to looking cues. The results are contrary to suggestions that speech is of primary importance in the development of attention, and further suggest (a) the necessity of considering attention as a factor in investigations of various modes of representation, and (b) that the importance of nonverbal means of instruction for preschoolers should not be neglected.

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State University of New York at Buffalo

The activity of attending is frequently mentioned in discussions of children's learning, and is often cited as the explanation for better performance with increasing age. Nevertheless, psychologists do not yet have a good description of the development of various attending activities in the child. The Soviet approach to this problem has been to emphasize the role which adults play in initially directing and organizing the child's attention; subsequently the child becomes able to employ similar means to direct his own attention (Zaporozhets & Elkonin, 1971, p. 78). Although the role of gestures and other actions is acknowledged, Soviet research has emphasized the "decisive significance" of speech in the development of the child's attending activities (Zaporozhets & Elkonin, 1971, p. 80). The present research compared the effectiveness of an adult's speech with two other cues, pointing and looking, in directing the behavior of preschool children. Pointing was chosen as a variable on the basis of its observed frequency in natural settings. Looking was chosen not only because of the demonstrated importance of an adult's eyes early in the life of a child (e.g., Fantz, 1966), but also because of the significance of eye contact as a form of nonverbal behavior (e.g., Argyle & Dean, 1965).

The relative effectiveness of each of these three cues was inferred from children's choices when confronted with two contradictory cues--for

example, when the experimenter verbally referred to one alternative while pointing or looking at a second alternative. A similar procedure has occasionally been used to investigate preferred modes of representation. For example, Grote and Lippman (1972) found that contradictory verbal information interfered less when preschool children were shown what to do, than did a contradictory demonstration when they were told what to do. Smith, Ramey, and Brent (1973) found that their subjects, from third grade to college, chose to learn by following visual cues even when contradictory verbal cues were present. In both of these studies an interval of time was interposed between presentation of the cues and subsequent performance. It is not clear, however, whether such performance is an indication of the mode in which the subject represents the information, or reflects also the preferred mode to which the subject is attending at the time the information is presented. The present study focuses on the latter issue, and thus subjects were allowed to respond immediately upon presentation of the cues without an intervening retention interval.

Pointing derives from earlier patterns of reaching and touching (Werner & Kaplan, 1967, p. 78). By the beginning of the second year children are able to refer to an object with an outstretched finger, at the same time looking directly at the person for whom the point is intended, and not at the object (Zaporozhets & Elkonin, 1971, p. 91; Anderson, 1972, p. 208; McGrew, 1972, p. 80). Little is known, however, concerning children's preference for directing an adult's attention with either pointing or verbal cues. In this study, therefore, children were also given an opportunity to direct an adult's attention to one of two alternatives.

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The study involved two procedures: In the first, the experimenter indicated by pointing, verbalizing, or looking whether a big or a little bead was to be put on a string by the child; following this, the children indicated for the experimenter which beads he should put on the string.

Method

The subjects were 23 nursery children from three to six years of age; seven were girls, the remaining sixteen were boys. The subjects were divided into two age groups: the mean of the younger group was 3 years, 10 months; the mean for the older subjects was 5 years, 3 months. Each subject was brought into a quiet room and asked to sit on the floor facing the experimenter. An inverted cardboard box was employed as a table for the materials, so that the experimenter's eyes, hands, and the materials would all be within the same field of vision for the subject. Following a brief period of familiarization, the experimenter placed several big and little beads on the table and asked the subject to indicate the big beads and then the little beads. Two additional subjects did not pass this pretest of the words "big" and "little" and were not included.

The experimenter then handed the subject a string, showed the subject a box of beads, and said: "We're going to put these beads on this string and make a necklace. I'll let you know which beads to put on first, and then you can put the beads on the string. Pay attention to what I do so you can put on the right beads." On each trial the experimenter placed a big and a little bead at opposite ends of the table, about 40 centimeters apart, and then indicated which of the beads the subject was to put on the string.

The sequence of trials began with two trials with consistent cues, e.g., the experimenter said "Now put this big bead on," and simultaneously looked and

pointed at the big bead. The pointing was always done with the index finger approximately 20 centimeters from the bead. The remaining 16 test trials included four trials from each of four conditions in a random order. In the Consistent Condition, the experimenter looked, pointed, and verbally referred to only one of the two beads. In the Look/Point Condition, the experimenter looked at one bead, pointed to the other, and said "Now put this bead on." In the Verbal/Point Condition, the experimenter said "Now put the big bead on," while pointing at the little bead and looking straight ahead. In the Verbal/Look Condition, the experimenter said "Now put the big bead on," while looking at the little bead and with his hands folded. The big and little beads were placed equally often at each end of the table, and were indicated equally often by each of the cues, both within conditions and across conditions. The beads were of various colors, but on each trial both beads were always of the same color. It occasionally appeared that the subject chose a bead without waiting for the experimenter to indicate the appropriate one. The subject was then cautioned to wait for the experimenter's indication, and the trial was repeated.

A second experimenter sitting behind the first and also facing the subject noted the choices on each trial. This experimenter also noted verbalizations, eye movements, the directness of the subject's reach toward the bead, and any indications of confusion on the part of the subject. Following the sequence of 16 trials, the experimenter took the string of beads, indicated to the subject that their roles were to change, placed two more beads on the table, and asked "Which bead shall I put on first?" This procedure was followed for four trials, with the second experimenter noting whether the subject indicated the appropriate bead either gesturally or verbally or both.

Results

The children were easily able to understand the task and to follow

the experimenter's directions. In the Consistent Condition, in which the pointing, verbalizing, and looking were all directed at the same bead, an inappropriate bead was chosen on only 3 of 92 possible trials. Pointing was easily dominant over looking. For trials in the Look/Point Condition, children chose the bead which was looked at by the experimenter on 3 of 92 trials; 2 of these choices were by the same child.

Verbal cues were attended to more often when the contradictory cue was looking than when the contradictory cue was pointing. The data are shown in Table 1, where it can be seen that in the Verbal/Point Condition Ss were more likely to follow the pointing cue, while in the Verbal/Look Condition Ss followed the verbal cue. A three-way analysis of variance for repeated measures with age, sex, and the Verbal/Point and Verbal/Look Conditions as factors was performed. The difference in the strength of the verbalization in the two conditions is significant ($F = 18.36$, $df = 1/19$, $p < .001$). In the Verbal/Point Condition, girls were more likely to follow the verbal cue than were the boys ($F = 4.63$, $df = 1/19$, $p < .05$). There was a slight, but not significant, tendency for older subjects to attend to verbal cues more often than younger subjects.

On some trials subjects made statements about the conflict between the cues or looked repeatedly from one bead to the other or hesitated in reaching. These evidences of hesitation were noted by the second experimenter. Mean numbers of hesitations are shown in Table 2. Newman-Keuls tests indicate that hesitations occurred more often in the Verbal/Point Condition than in the Consistent or Look/Point Conditions ($F = 3.92$, $df = 3/63$, $p < .05$). These hesitation data are consistent with the choice data in suggesting that verbalizing and pointing are strong cues relative

to looking. There are no significant age effects in the numbers of hesitations. Further inspection of the data indicates that, for those few trials on which subjects show hesitations, the conflict is resolved in the following manner: in the Look/Point Condition, by following the point; in the Verbal/Point Condition, there was no clear preference; in the Verbal/Look Condition, by following the verbal cue.

During the second procedure in this study, each subject indicated gesturally or verbally which of the two beads the experimenter should choose. In general subjects either handed an appropriate bead to the experimenter or indicated a bead by pointing. Verbal cues, i.e., descriptions of the beads, were used by only two of the younger and four of the older subjects. There was a tendency for subjects who did not follow the verbal cues in the earlier part of the study (i.e., their choices were appropriate to the pointing or the looking cues of the experimenter) not to use verbal cues to direct the experimenter's attention in the second procedure. Although there is not sufficient data to test the strength of this relationship, the trend suggests that children may direct other people's attention by means of the cues to which the children themselves are responsive.

Discussion

It can be concluded from the choice and hesitation data that preschoolers are particularly likely to attend to the pointing cues of adults, less likely to follow verbal cues, and least likely to attend to the adult's eyes as a cue. Of course, when adults attempt to direct children's behavior, their cues are generally not in conflict as in the present study, but these data do indicate to which of the adult's various cues preschoolers are most likely to attend. It should be noted that the results are quite specific to the particular situation of the present study--for example,

the strength of pointing relative to the verbal cue may increase or decrease if the extended finger of the experimenter were more or less than eight inches from the object. The strength of pointing may also be explained in part by the timing of pointing and verbalizations as cues: Pointing conveys information instantly, while the verbal cue does not convey the important information until the fourth word ("Now put the big bead on.") Nevertheless, the data indicate that preschoolers do not wait to hear and evaluate the verbal information, but rather respond primarily to the gestural cues of the adult. Third, the results may have been biased by the experimenter's instructions to "Pay attention to what I do . . . ." It is possible that this word influenced the children's attention toward gestures rather than words (as opposed to both gestures and words).

In a pilot-study[1] designed to test these alternatives, children were instructed to "Pay attention and I'll let you know . . . ," and the verbal cues were reduced to "big bead" and "little bead," so that the gestural and verbal information were presented simultaneously. Under these conditions, a small sample of preschoolers attended primarily to the verbal rather than to the gestural cues. The instructions and cues of the initial investigation appear at least as reasonable and naturalistic as those of the pilot-study, and yet the relative effectiveness of cues in directing children's attention was exactly opposite in the two studies. Thus the original research question concerning the relative effectiveness of pointing, verbalizing, and looking should be reformulated: What are the conditions under which preschoolers will attend to verbal, visual, or other cues?

Contrary to the conclusion of Zaporozhets and Elkonin (1971, p. 80) that speech is of "decisive significance" in the development of attending in the preschool child, there can also be an orientation toward gestures. This is consistent with Luria's (1969, p. 140) view that it is not prior to but rather during the period from four to seven years of age that the child becomes fully able to understand speech outside the limits set by the perception of objects and gestures in an immediate, concrete situation. The view that language may be gaining increased strength as an attentional cue during the preschool period is supported by the finding in the present study that girls were more likely to follow the verbal cue (rather than the point) than boys. This is consistent with other evidence suggesting that speech development proceeds more rapidly in girls than in boys (Moore, 1967).

Learning and cognitive theories have not yet provided us with a complete theory of instruction (Olson, 1970, p. 42), a theory which considers not only the problems of acquisition from the child's point of view but also the nature of the interaction between adult and child in the learning situation. Although language is certainly an important means of instruction, it may be that insufficient attention has been given to nonverbal means such as modeling and the use of gestures (Olson, 1970, p. 200). Olson reports success in teaching the diagonal at an early age with a Montessori method involving demonstrations of alternatives, while verbal methods at the same early age were less successful. Hess and Shipman (1972), although emphasizing the encoding of task essentials in language, also note that mothers who successfully teach their children various tasks also supplement the language with nonverbal demonstrations.

In traditional Turkish villages there is a minimum of verbal instruction when certain tasks are taught. In learning to knit or to prepare food or to chop kindling, the child is allowed to observe the adult and then try the task himself. Feedback comes from observation by the child of the finished product, less often from the adult commenting upon the product (Helling, 1966, p. 59; Carpenter, 1969, p. 11). Similarly, in our own culture a number of skills are acquired by observation and assessment of the performance by the child himself: riding a bicycle, blowing bubblegum, whistling, working a yo-yo, roller-skating, Cat's Cradle. Children learn all of these and many other skills without the use of verbal means of instruction by adults.

The present results do <u>not</u> show that preschool children represent information in a gestural or enactive fashion rather than verbally--this study emphasized instead how the child is oriented in his efforts to obtain information. Studies of representational modes must take into consideration that the amount of information which the child is found to represent verbally, by means of images, etc. depends upon the extent to which the child attends to verbal or other information as it is presented.

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Footnotes

Extended version of a paper presented at the meeting of the American Psychological Association, Chicago, September 1975. The authors wish to thank Mrs. Norma Fischer and the children of the Main-Way Child Nursery Center in Buffalo for their cooperation. Requests for copies should be sent to John A. Meacham, Department of Psychology, State University of New York at Buffalo, 4230 Ridge Lea Road, Buffalo, New York, 14226.

[1] The pilot-testing was carried out by Dana Plude.

TABLE 1

MEAN NUMBERS OF CHOICES INDICATING

ATTENTION TO VERBAL CUES (MAXIMUM = 4)

	Condition	
Age	Verbal/Point	Verbal/Look
4		
Boys	0.7	2.3
Girls	1.5	2.5
5		
Boys	1.1	2.6
Girls	2.7	2.7

TABLE 2

MEAN NUMBERS OF HESITATIONS (MAXIMUM = 4)

		Condition		
Age	Consistent	Look/Point	Verbal/Point	Verbal/Look
4	.64	.91	1.09	.73
5	.25	.42	1.50	1.17